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(54) IMAGE MONITOR SYSTEM AND DECODER FOR ITS CODING SIGNAL

(57)Abstract:

PROBLEM TO BE SOLVED: To provide an image monitor system where a frame memory is not required to multiplex an image signal, the received image signal is inexpensively multiplexed, the signal is recorded after compression coding and image quality deterioration of the input image signal is easily controlled at compression coding.

SOLUTION: The image monitor system receiving a plurality of moving image signals is provided with a synchronizing signal generating section 108 that synchronizes the received image signals, a changeover section 103 that selects any of a plurality of input images based on a vertical synchronizing signal generated from the synchronizing signal generating section 108, a compression coding section 105 that applies inter-frame

compression to the selected image signal and recording sections 106, 107 that record the compressed signals.

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2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]

[Claim 1] The image monitoring system carry out having the synchronizing signal generating section for synchronizing an input picture signal, the change-over section which switches two or more input images based on the Vertical Synchronizing signal generated in this synchronizing signal generating section, the compression coding section which carry out the inter-frame compression of the picture signal switched the account of a top, and the Records Department which record the signal by which compression was carried out [above-mentioned] in the image monitoring system which considers two or more dynamic-image signals as an input as the description.

[Claim 2] The image monitoring system carry out having the synchronizing signal generating section for synchronizing an input picture signal, the change-over section which switches two or more input images based on the Vertical Synchronizing signal generated in this synchronizing signal generating section,

the compression coding section which carry out the inter-frame compression of the picture signal switched the account of a top, and the network interface section for transmitting the signal by which compression was carried out [above-mentioned] in the image monitoring system which considers two or more dynamic-image signals as an input as the description.

[Claim 3] The synchronizing signal generating section for synchronizing an input picture signal in the image monitoring system which considers two or more dynamic-image signals as an input, The change-over section which switches two or more input images based on the Vertical Synchronizing signal generated in this synchronizing signal generating section, Image monitoring system characterized by having the selection section which chooses whether the picture signal switched the account of a top is filtered, the compression coding section which carries out inter-frame compression of the picture signal by which selection was made [above-mentioned], and the Records Department which records the signal by which compression was carried out [above-mentioned].

[Claim 4] The synchronizing signal generating section for synchronizing an input picture signal in the image monitoring system which considers two or more dynamic-image signals as an input, The change-over section which switches two

or more input images based on the Vertical Synchronizing signal generated in this synchronizing signal generating section, Image monitoring system characterized by having the selection section which chooses whether the picture signal switched the account of a top is filtered, the compression coding section which carries out inter-frame compression of the picture signal by which selection was made [above-mentioned], and the network interface section for transmitting the signal by which compression was carried out [above-mentioned].

[Claim 5] Decryption equipment characterized by having the playback image memory which stores the decoded compression picture signal in the decryption equipment which decrypts the signal by which compression coding was carried out with above-mentioned claim 1, claim 2, and image monitoring system according to claim 3 or 4, and the address generation section which generates the lead address of a playback image so that only the desired field may be outputted from this playback image memory.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the image monitoring system which performs record of the multi-input video signal which used the picture compression encoder of the interlace picture signal represented by MPEG 2 (ISO/IEC 13818-2), and transmission, and the decryption equipment of the coded signal.

[0002]

[Description of the Prior Art] The monitoring system using a TV camera has two or more camera inputs, in order to take large monitor area, by carrying out frame composition of those images, it switches for every fixed time amount by coincidence or the frame switcher, and monitoring system which performs record and transmission is put in practical use. Hereafter, configuration of the monitoring system of four conventional inputs and the 2 input simultaneous record VTR and explanation of operation are given using a drawing.

[0003] Drawing 9 is a block diagram of the conventional image monitor record regenerative apparatus. The picture signal from a camera 901,902 is switched for every field with a switch 903, and is inputted into a video circuit 904. Here, the signal for switching a switch 903 is made by the servo circuit 905 as an RF

switching pulse 906.

[0004] Moreover, RF switching pulse 906 generated in this servo circuit 905 is supplied to the cylinder 907 containing the heads A and B in VTR, and chooses the head which records the picture signal outputted from the video circuit. For example, when RF switching pulse 906 is a high, it is recorded by the head of A, and in a low, it is recorded by the head of B. The image corresponding to the camera of hope is reproduced by reproducing only the signal of the head corresponding to the camera to reproduce, respectively at the time of playback.

[0005] The block diagram of the image monitor recording apparatus which switches an image to drawing 10 by the conventional frame switcher is shown. The picture signal outputted from cameras 1001, 1002, 1003, and 1004 here is inputted into the frame switcher 1005. The inputted picture signal is switched by the frame switcher 1005, and is recorded on VTR1006.

[0006] In the frame switcher 1005 interior, the picture signal inputted from each camera is inputted into frame memories 1007, 1008, 1009, and 1010, respectively, and the inputted signal is switched with a switch 1011 and outputted as an output picture signal of the frame switcher 1005. Thus, the above-mentioned conventional image monitor record regenerative apparatus

can also carry out record playback of the two inputs.

[0007]

[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional frame switcher 1005, in order to multiplex the image of many inputs, many frame memories were needed, therefore hardware became large, and there was a problem that cost started.

[0008] Moreover, since it had multiplexed by recording on a separate field in the recording device of the 2 inputs combined with VTR using two heads which are the descriptions of VTR, when recording on the media recorded on the same fields other than VTR, or when the signal which carried out compression coding of the digitized signal by MPEG 2 etc. is recorded, there was a problem for which compression coding equipment is needed several input minutes and say.

[0009] This invention solves such a conventional problem and two or more input picture signals are multiplexed by little hardware, and record on archive media, such as a disk, by carrying out compression coding of the signal, or it transmits, and aims at offering the image monitoring system which decodes them further and is reproduced to a picture signal.

[0010]

[Means for Solving the Problem] This invention is equipped with the switch for switching the synchronizing signal generating section and the input picture signal for taking the synchronization of an input picture signal, and the inter-frame predictive compression encoder of the interlace signal which performs inter-frame predictive compression coding of an interlace signal for the switched picture signal in order to attain the above-mentioned object.

[0011] Therefore, according to this invention, it has an operation that image quality degradation of the image multiplexed by being able to realize cheaply and making degradation of the compression efficiency of the inter-frame predictive compression encoder of an interlace signal into the minimum is made to the minimum, by realizing multiplexing of an input image not using the image memory for multiplexing an input image.

[0012]

[Embodiment of the Invention] The synchronizing signal generating section for synchronizing an input picture signal, the change-over section which switch two or more input images based on the Vertical Synchronizing signal generated in this synchronizing signal generating section, the compression coding section which carry out the inter-frame compression of the picture signal switched the

account of a top, and the Records Department record the signal by which compression was carried out [above-mentioned] make invention of this invention according to claim 1 have in the image monitoring system which considers two or more dynamic-image signals as an input.

[0013] In the image monitoring system with which invention of this invention according to claim 2 considers two or more dynamic-image signals as an input The synchronizing signal generating section for synchronizing an input picture signal, and the change-over section which switches two or more input images based on the Vertical Synchronizing signal generated in this synchronizing signal generating section, It is made to have the compression coding section which carries out inter-frame compression of the picture signal switched the account of a top, and the network interface section for transmitting the signal by which compression was carried out [above-mentioned].

[0014] In the image monitoring system with which invention of this invention according to claim 3 considers two or more dynamic-image signals as an input The synchronizing signal generating section for synchronizing an input picture signal, and the change-over section which switches two or more input images based on the Vertical Synchronizing signal generated in this synchronizing

signal generating section, It is made to have the selection section which chooses whether the picture signal switched the account of a top is filtered, the compression coding section which carries out inter-frame compression of the picture signal by which selection was made [above-mentioned], and the Records Department which records the signal by which compression was carried out [above-mentioned].

[0015] In the image monitoring system with which invention of this invention according to claim 4 considers two or more dynamic-image signals as an input The synchronizing signal generating section for synchronizing an input picture signal, and the change-over section which switches two or more input images based on the Vertical Synchronizing signal generated in this synchronizing signal generating section, It is made to have the selection section which chooses whether the picture signal switched the account of a top is filtered, the compression coding section which carries out inter-frame compression of the picture signal by which selection was made [above-mentioned], and the network interface section for transmitting the signal by which compression was carried out [above-mentioned].

[0016] It is made for invention of this invention according to claim 5 to have the

playback image memory which stores the decoded compression picture signal, and the address generation section which generates the lead address of a playback image so that only the desired field may be outputted from this playback image memory in the decryption equipment which decrypts the signal by which compression coding was carried out with above-mentioned claim 1, claim 2, and image monitoring system according to claim 3 or 4.

[0017] (Gestalt of the 1st operation) Drawing 1 starts the gestalt of operation of the 1st of this invention, and shows the configuration of the image monitoring system of 2 inputs. In the gestalt of this operation, a camera 101 and a camera 102 output a picture signal to a switch 103 synchronizing with the synchronizing signal from the outside, respectively.

[0018] Here, a synchronizing signal is a signal generated from the synchronizing signal generating section 108, this signal can take the vertical synchronization of a picture signal, and a Vertical Synchronizing signal, a composite synchronizing signal, a black burst signal, etc. correspond. In a switch 103, synchronizing with a synchronizing signal, a switch and this switch 103 make switch selection of the signal of a camera 101 and a camera 102 for the signal from a camera 101 and a camera 102 for every field to the timing of a vertical synchronization.

[0019] The selected picture signal is digitized by the analog-to-digital (A/D) transducer 104, and is inputted into the inter-frame predictive compression coding section 105 of an interlace signal. Here, since the output signal from each camera 101,102 is an analog signal, it has digitized with the analog-to-digital converter 104, but when an input signal is a digital signal, it is unnecessary in an analog-to-digital converter 103.

[0020] The picture signal by which digitization was carried out [above-mentioned] is compressed in the inter-frame predictive compression coding section 105 of an interlace signal, and is further recorded on an optical disk 107 by the optical pickup 106.

[0021] Although recorded on the optical disk with the gestalt of this operation, if it is the media which can record a digital signal, of course, a hard disk, a high capacity floppy disk, or tape media can be used besides an optical disk.

[0022] The relation of the output picture signal 204 chosen as drawing 2 by the input picture signal 201, Vertical Synchronizing signal 203, the switch 103, and this switch 103 from each cameras a and b is shown. An image 201 is a field image outputted from Camera a, and an image 202 is a field image outputted from Camera b. Each field image is outputted synchronizing with Vertical

Synchronizing signal 203.

[0023] If a switch 103 is switched by Vertical Synchronizing signal 203, for example, the image of Camera a is chosen when a signal is Low (period when the level of 203 is low), and Camera b is chosen at the time of High, the output image from a switch 103 will turn into the image 204 with which the image from Camera a and Camera b was outputted by turns here. However, as shown in drawing 3 (a) and (b), since this image is an image from a different camera for every field, it becomes as it is shown in the field sign 3 (b) seen by the frame image.

[0024] The field motion vector and field orthogonal transformation which used the field image as the base are included in the means of inter-frame prediction or the compression in a frame, and since they are usually chosen between the fields like the frame image of drawing 3 (b) in the case of an image with little correlation, the inter-frame predictive compression coding method of the interlace signal represented by MPEG 2 (ISO/IEC 13818-2) can encode degradation for the image of drawing 3 (b) few.

[0025] (Gestalt of the 2nd operation) It changes to the Records Department which consists of the optical pickups and optical disks which are applied to the

gestalt of said 1st operation at drawing 4 , and the 2 input images monitoring system which replaced this at the network interface 401 is shown.

[0026] It reaches 101-105 during the configuration of the 2 input images monitoring system shown in drawing 4 , and 108 is the same as that of the gestalt of the 1st operation, and omits explanation here. Therefore, the signal compressed in the inter-frame predictive compression coding section 105 of an interlace signal is transmitted to digital channels, such as ISDN and LAN, through a network interface 401. It becomes possible for this to supervise the image multiplexed by this monitoring system in the remote place, or to record.

[0027] (Gestalt of the 3rd operation) The gestalt of 2 input images monitoring system is shown in drawing 5 . It reaches 101-107 during the configuration of this monitoring system, and 108 is the same as that of the gestalt of said 1st operation, and omits explanation here.

[0028] The digital picture signal outputted from an analog-to-digital converter 104 is inputted into a switch 502 and a filter 501, respectively. One side or combination of a filter spatial [a filter 501] and time realizes, and a part of inputted digital picture signal or the whole part is band-limited. This band limit is performed in order to raise compression efficiency, in case it encodes. That is,

the band-limited picture signal becomes possible [compressing even into the smaller amount of signs (high compression)] to the signal which is not band-limited, in order to concentrate in the band where energy was restricted.

[0029] The digital picture signal band-limited with the above-mentioned filter 501 is inputted into a switch 502. A switch 502 chooses one side of the band-limited image which was outputted from the filter 501, and the image by which the direct output was carried out from the analog-to-digital converter 104 and which is not band-limited according to the signal from a switch 503, and outputs it to the coding section 105. The coding section 105 chooses an important field image out of two field images corresponding to said two cameras 101,102, and outputs a selection signal to a switch 503 based on the result at the same time it encodes the inputted digital image.

[0030] Since in the case of monitoring system the image of the camera which is photoing the invader becomes important when there is an invader, it is necessary to output the signal which chooses the camera. in this case -- for example, -- that, as for the coding section 105, the motion vector of the field image with which the invader is photoed is detected **** -- inter-frame -- difference -- a selection signal is created using information increasing.

[0031] For example, it switches so that a switch 503 may carry out the direct input of the synchronizing signal generating section 108 to the signal to a switch 502 with a selection signal, since [by which a switch 502 runs synchronizing with / like / a switch 103] the signal is inputted into the coding section 105 directly [when the signal of a camera 101 is important, while the signal of a camera 101 is digitized with the analog-to-digital converter 104]. Conversely, when the signal of a camera 102 is important, a switch 502 switches a switch 503 so that the signal which reversed the signal of the synchronizing signal generating section 108 with the inverter 504 may be made to input into a switch 502 with a selection signal, in order to move by the switch 103 and the opposite phase synchronously.

[0032] Similarly, when [both] both the images of two cameras 101,102 are important, or when it is important and there is nothing, a selection signal is added to a switch 503, respectively so that one side may be chosen, and yes or low level may be inputted into a switch 502.

[0033] Therefore, according to the gestalt of this operation, among the images from two cameras 101,102, more, compression coding can be carried out and an important image can be recorded on high definition. Furthermore, both the

images from two cameras are important, when [both] there is nothing, by band-limiting, compressibility can be raised more and, in the case of the same archive medium of capacity, this becomes possible [carrying out long duration record].

[0034] Furthermore, the signal created by the signal from the sensor corresponding to each camera 101 and 102 is sufficient as the selection signal outputted from the coding section 105 shown in drawing 5 . If the sensor corresponding to each camera 101 and 102 is set to A and B, the creation approach of the selection signal in this case will create the signal for choosing yes or a low so that a switch 503 may not switch [in the sensor of A and B] with a synchronizing signal in ON (detection) or OFF (un-detecting). Moreover, when one side of Sensors A and B is ON (detection), in order [which does not choose a filter 501 when a switch 103 is switched to the camera corresponding to the sensor used as ON] to switch like, the selection signal which chooses direct or the reversed signal for the signal of the synchronizing signal machine 108 is created.

[0035] (Gestalt of the 4th operation) It changes to the Records Department which consists of the optical pickups and optical disks concerning the gestalt of

said 3rd operation to drawing 6 , and the 2 input images monitoring system which transposed this to the network interface 401 is shown. 101in configuration of monitoring system shown in drawing 6 - 105, 108, and 501-503 are the same as that of the gestalt of the 3rd operation.

[0036] In this monitoring system, the signal compressed in the inter-frame predictive compression coding section 105 of an interlace signal is transmitted to digital channels, such as ISDN or LAN, through a network interface 401. It enables this to supervise and record the image multiplexed by this monitoring system in a remote place.

[0037] (Gestalt of the 5th operation) Drawing 7 shows the configuration of the inter-frame predictive compression decryption equipment which is the decoder which decodes the coded signal recorded or transmitted with the 2 input images monitoring system shown in the gestalt of said 1-4th operations.

[0038] An input terminal 701 is an input terminal of said encoded compression picture signal. The compression picture signal inputted from this terminal 701 is inputted into the variable-length agreement decode section 702, and variable-length decode is carried out. It passes through motion vector information address generation section 709 among the compression picture

signals by which variable-length decode was carried out, and the information on other is outputted to the reverse rectangular cross converter 703, respectively. The reverse rectangular cross converter 703 carries out reverse orthogonal transformation of the compression picture signal by which variable-length decode was carried out, it is further inputted into the reverse quantization section 704, and reverse quantization is carried out. The compression picture signal by which reverse quantization was carried out is added with the prediction picture signal outputted from the playback image memory 706 in the adder 705, and is again outputted to the playback image memory 706.

[0039] The playback image memory 706 is outputted to an adder 705 by making into a prediction picture signal the playback image shown using the motion vector information outputted from the variable-length sign decode section 702. For this reason, the address generation section 709 outputs the address for outputting the playback image shown using the inputted motion vector information as the lead address. Moreover, the address generation section 709 generates the lead address for outputting the light address and the playback image for recording the image outputted from an adder 705 to an output terminal 708 through a spatial filter 707. A spatial filter 707 processes a spatial filter to the

picture signal inputted from the playback image memory 706, and outputs it to an output terminal 708.

[0040] Next, a part of playback image memory is shown in drawing 8 . When space of a playback image memory is made into Width X and Length Y, the playback image of one frame is recorded on the appearance shown in the slash section of drawing 8 . Here, the slash sections A and B show the pixel of each field image.

[0041] The conventional decoder outputs the slash section A first, then outputs the slash section B, and generates the address for outputting in such sequence in the address generation section. In this invention, the address which shows the image of the slash sections A and B with the field switch signal inputted from the external terminal 701 is generated in the address generation section.

[0042] This becomes possible to choose and decode only the method of one of two multiplexed picture signals, and to reproduce. Moreover, degradation of the image by being repeated in the field is mitigated with a spatial filter 707. Thus, according to the gestalt of the above-mentioned implementation, it has the effectiveness that the picture signal of 2 inputs can be multiplexed, without increasing the memory for decoding the memory and the multiplexed signal for

multiplexing a 2 input picture signal. Moreover, it has the effectiveness that it can compress without degrading the compression efficiency of an image in order to multiplex for every field image.

[0043]

[Effect of the Invention] In this invention, the image monitoring system which held down cost is realizable. Furthermore, by band-limiting to the low input image of importance, when the compressibility of an unimportant image can be raised, and chart lasting time can be lengthened only in the case of an unimportant image and there is an important image, it has the effectiveness that the image quality of an important image can be raised.

1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] The outline block diagram showing the gestalt of operation of the 1st of the image monitoring system of this invention

[Drawing 2] Drawing showing the principle of operation of a field image change-over

[Drawing 3] Drawing showing the image by which the field image change-over was carried out

[Drawing 4] The outline block diagram showing the gestalt of operation of the 2nd of the image monitoring system of this invention

[Drawing 5] The outline block diagram showing the gestalt of operation of the 3rd of the image monitoring system of this invention

[Drawing 6] The outline block diagram showing the gestalt of operation of the 4th

of the image monitoring system of this invention

[Drawing 7] The outline block diagram showing the gestalt of operation of the decryption equipment which decodes the signal of the image monitoring system of this invention

[Drawing 8] Drawing showing the content of the playback image memory of a decoder

[Drawing 9] The outline block diagram of the conventional image monitor record regenerative apparatus

[Drawing 10] The outline block diagram of other conventional image monitor record regenerative apparatus

[Description of Notations]

101 Camera

102 Camera

103 Switch

104 Analog-to-digital Converter

105 Coding Section

106 Optical Pickup

107 Optical Disk

108 Synchronizing Signal Generating Section

401 Network Interface

501 Filter

502 Switch

503 Switch

701 Input Terminal

702 Variable-length Agreement Decode Section

703 Reverse Rectangular Cross Converter

704 Reverse Quantization Section

705 Adder

706 Playback Image Memory

707 Spatial Filter

708 Output Terminal

709 Address Generation Section

[Translation done.]